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INTRODUCTION

A computer-based information storage and retrieval system is proposed to support the administration and management of MIDSD educational programs. The primary functions of SMART (System for Managing and Reporting on Training) will be to:

(1) Generate reports containing information relevant to near-term planning of programs, and

(2) To provide data in detail sufficient to facilitate day-to-day operation and management of courses within a program.

Planning reports will provide, for example, training costs incurred to date--on a program, course, or student basis; operational data will include names of course enrollees, course schedules, etc.

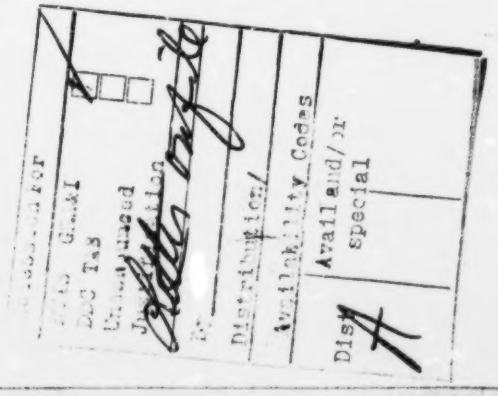
Access to the SMART files, for both update and retrieval, will be through low-speed terminals; on-line processing will increase the currency of data resident in the system and will permit users at headquarters and remote locations to meet their informational needs with minimal effort and delay.

Ease of access and rapid responsiveness are the features which distinguish SMART from other management information systems available to MIDSD training planners and administrators. Much of the data envisioned for the SMART files can be found in management reports derived from the annual training plan system or from the EPA-wide DIP system. The basic training record of the DIP system, form DI-510A (Request, Authorization and Record of Employee Training) documents the name, organizational unit,

and location of a trainee, the name of the course taken, the cost, etc. However, the management reports employing DI-510A as input are generated at fixed intervals and too infrequently to be responsive to the immediate information needs of training program planners and administrators in MIDSD. Further, completed forms are frequently not available at the time the information is needed. Trainees attending internal courses are not required to complete DI-510A; those who must travel to training frequently do not fill it out until just before attending. If procedures were modified to require that all trainees complete DI-510A as a condition of course registration, relevant data from completed DI-510A's could easily be stored in SMART for local use before the forms are sent on to EPA headquarters.

SMART will be restricted to training activities originating wholly or substantially with MIDSD. Specifically, the system files will contain data relevant to training programs sponsored and paid for by MIDSD; individual courses in ADP sponsored by other departments at headquarters MIDSD; and ADP training jointly sponsored by MIDSD and the National Computing Center. ADP training presented by other government agencies or by other organizations within EPA (e.g., Pesticides Division) will be excluded from SMART. It is felt that since procedures already exist for administration of such training, incorporation of public offerings would be redundant.

The following sections provide a functional description of the system. Considerations about the organization and storage of data files and the software employed to manipulate them necessarily await final decisions concerning the type of data to be stored and the type and level of user/system interaction to be supported.



SYSTEM REPORTS

Data generated during the creation and scheduling of courses and during the registration of students can be readily compiled by SMART to provide management with timely and accurate information on all aspects of training, including costs (for a course, for an organization over courses, for types of courses, etc.), subjects taught, and personnel attending. To facilitate use of the data, hard copy devices would provide paper printouts in addition to the output displayed on terminal screens.

Figure 1 presents a course planning guide to assist the training manager or coordinator in executing the activities required in publicizing a course, allocating the necessary resources to support the training and identifying personnel responsible for registering students and conducting the course. Through updating, the report documents those activities completed and serves as a reminder for those yet to be done.

Figure 2 presents a roster of current enrollees. By periodic reference to this report the training officer responsible for a course offering can ascertain whether a sufficient number of personnel have registered and either close the registration or take steps to obtain more students. In support of the latter activity, the roster contains a list of personnel within the offering site commuting area who can provide names of personnel for whom the course would be beneficial.

To facilitate planning for future courses and to evaluate the appropriateness of completed offerings, management requires information on the number and type of attendees at courses in a variety of subject matter areas. Figures 3 and 4 present sample attendance reports which

provide input to these decision processes. In Figure 3, the attendance at a particular course offering is broken out by organization and by job category; Figure 4 shows the number of personnel attending all MIDSD-sponsored courses by organization for a given period. In either case examination of row and column totals provide information as to which organizations are making use of the training programs and which are not, and what types of personnel find what courses relevant and useful to their job functions.

Where course offerings are to be conducted by outside contractors, the training manager must have information as to whether funds are available to pay for the service. In this case, the required data concerns the dollars spent to date and, thus, derivatively, the dollars presently available. Figure 5 presents a sample report containing the dollars spent to date by contractor and in total. These data enable the training manager to determine whether he has funds sufficient to pay for anticipated course offerings, and to take steps if necessary to eliminate one or more such courses, reduce the class size or transfer the conduct of the training to in-house personnel.

Figure 6 presents a report which summarizes the courses offered over an extended period of time. This type of information provides input to planning in that it enables the training manager to identify subject matter areas which have not been covered in some time and which are potential candidates for incorporation in future ADP training programs.

SMART COURSE PLANNING GUIDE

COURSE NAME & CODE: INTRODUCTION TO JCL (IJCL)

OFFERING CODE: IJCL-02

OFFERING DATE: 15 SEPT 1976

MINIMUM ENROLLMENT: 15

INSTRUCTOR NAME: ?

ORGANIZATION: ?

PHONE: ?

ACTIVITY	DATE PERFORMED
PUBLICITY	
Bulletin Board Flyers Catalogue	20 July 1976
SITE ARRANGEMENTS	2 August 1976
TRAINING MATERIALS	
Handouts References Terminal Time	

CONTACT TRAINING COORDINATOR:

Figure 1. SAMPLE COURSE PLANNING GUIDE

DATE: 31 AUG 1976 OFFERING CODE: IJCL-02

CURRENT CLASS ROSTER

COURSE: INTRODUCTION TO JCL (IJCL)

OFFERING DATE: 15 SEPT 1976

LOCATION: RTP

MINIMUM ENROLLMENT: 15

NAME	TITLE	ORGANIZATION	ADP COORDINATOR (Phone)
Cain, Joseph	Management Analyst	MSAPC/DPM	Matzo, Augustine (761-5230)
Lambert, Robert	Mechanical Engineer	RP/FOD	Smith, Arthur (755-5482)
Kohler, James	Programmer	AQPS/CPD	Libby, Morton (688-8146)

STUDENT SOURCES WITHIN OFFERING SITE COMMUTING AREA

ORGANIZATION	NAME	TITLE	PHONE

Figure 2. SAMPLE CLASS ROSTER WITH ENROLLMENT SUPPORT INFORMATION

DATE: 18 SEPT 1976

SMART STANDARD REPORT SERIES

REPORT: COURSE ATTENDANCE BY ORGANIZATION AND JOB CATEGORY

COURSE: INTRODUCTION TO JCL (IJCL)

OFFERING CODE: IJCL-02

OFFERING DATE: 15 SEPT 1976

TOTAL ATTENDANCE: 23

JOB CATEGORY	ORGANIZATION			
	EMSL/ORD	ESRL/ORD	OAWM	NCC/OA
Manager	0	0	0	1
Administrative	2	1	3	1
Scientist/Engineer	4	0	1	3
Computer Specialist	1	0	2	4

Figure 3. SAMPLE ATTENDANCE SUMMARY REPORT

DATE: 31 DEC 1976

SMART STANDARD REPORT SERIES

REPORT: QUARTERLY ATTENDANCE AT ADP TRAINING COURSES BY EPA ORGANIZATIONS

ORGANIZATION	JULY-SEPT 1976 NO. PERSONS	OCT-DEC 1976 NO. PERSONS	TOTAL
AAPM	5	2	7
OA	10	6	16
OPE	4	3	7
ORM	7	1	8
AAEGC	4	1	5
OGC	12	19	31
OGE	15	12	27
OWE	10	21	31
AAWHM	0	2	2
OWPS	2	5	7
OWPO	4	0	4
OPP	1	1	2
OTS	0	1	1
TOTAL	74	74	148

Figure 4. SAMPLE QUARTERLY ATTENDANCE REPORT

DATE: 2 OCT 1976

SMART STANDARD REPORT SERIES

REPORT: EXPENDITURES FOR CONTRACTOR-SUPPLIED TRAINING

PROGRAM: COMPUTING LITERACY FOR ADMINISTRATORS

SPONSOR: MANAGEMENT INFORMATION DATA SYSTEMS DIVISION

PERIOD: 1 JULY 1976 - 30 SEPT 1976

CONTRACTOR NAME	EXPENDITURE
Computer Learning Center	1000
Data Systems, Inc.	500
Honeywell	2000
Total	3500

Figure 5. SAMPLE TRAINING COSTS REPORT

DATE: 31 DEC 1976

SMART STANDARD REPORT SERIES

REPORT: ADP COURSE OFFERINGS--QUARTERLY LISTING

PERIOD: JULY-SEPTEMBER 1976

NAME	ID CODE	SPONSOR
Forecasting ADP Needs	FOREC-01	MIDSD
ADP Staffing	STAF-03	MIDSD/CSDEB
ADP Contracts Management	CONTR-01	MIDSD/MISB
Data Quality Control	QUAL-02	MIDSD/TOB
1100 Series Systems Concepts	1100S-02	MIDSD/NCC

PERIOD: OCTOBER-DECEMBER 1976

NAME	ID CODE	SPONSOR
1100 Executive Control Language	1100F-02	MIDSD/NCC
Data Entry Methods	ENTR-01	MIDSD/TOB
System 2000 Retrieval	2000R-04	MIDSD
Survey of Scientific Software	SCI-01	MIDSD

Figure 5. SAMPLE SUMMARY OF QUARTERLY COURSE OFFERINGS

DATA BASE

Tables 1, 2 and 3 present the basic information to be stored by the system. This file has three levels of information. Included are information on the course including name, ID code, sponsor, prerequisites (Table 1), and the offering--training coordinator, training site, schedule, registration information--(Table 2). Some of the items will probably remain unchanged once entered into the system. Others will be updated with varying frequency until the course offering commences; these include enrollment size, dates, session scheduling, and other aspects of a particular offering. Table 3 presents the information to be stored for each student registered for a given course offering. In addition to conventional descriptors for the individual, the course, and the offering, a field has been included to indicate whether the course is a component of the individual's training plan.

The above descriptions of course, offerings and attendee data have been kept separate for ease and clarity of exposition. Whether or not they will be stored separately or merged into a single file should be decided as part of system software design and implementation. Further, no attempt is made to define the characteristics (formats, codes, etc.) of the various data fields discussed. It is anticipated that existing code conventions for individuals, organizations, sites, etc., would be reasonable and appropriate descriptive entries for the data base.

USER/SYSTEM INTERACTION

Software to support file updating and user access to the system is to be developed in three areas: (1) Course Creation, (2) Course Planning, and (3) Student Registration.

Personnel responsible for planning, management of training resources, enrollment of applicants, and administration of training will be able to access and modify, as needed, information relevant to each of the above areas. The system will facilitate user requests through a query capability, implemented at the terminal, which will identify the nature of the user's query, display the appropriate data, and accept modifications as required. Following are sample descriptions of the type of user/system interactions envisioned. While these activities could be handled through batch processing, to do so would detract from the convenience aspect of the system and hence deteriorate the completeness and currency of data in the SMART files. A training officer will be more likely to see to the registration of a student or examine an enrollment report if he need only turn to his terminal and enter a few statements. To fill out a form, submit it to computer personnel for entry to the system, and await the output is to increase the likelihood that the press of other duties will interfere.

Course Creation and Planning

An ADP training section, having decided that the need exists for training in a particular subject, would create a course record. Figure 7 presents a sample format of user/system interaction for this function. Note that the figure reproduces the information contained in Tables 1 and 2. In this format, system queries to the user are in capital letters to the left of the screen and the user inputs appropriate information on the right. All the user need do is enter the data; the system will automatically position his typed entries opposite the request line.

Table 1. SMART Course Data Records

Course Name

Course Identification Code

Sponsoring Organization(s) Code(s)

Entry Requirements
- Grade
- Position
- Prerequisite Courses

Training Coordinator
- Name
- Organization Code
- Phone Number

Offeror (Staff, Contractor Name)

Table 2. SMART Course Offering Data Records

Course Identification Code

Offering Identification Code

Offeror Name

Cost per Attendee (if private contractor)

Minimum Class Size

Maximum Class Size

Registration Close Date

Course Site

Instructor Name

Schedule
- Number of Days
- Dates
  - 1st Day
  - 2nd Day
  - .
  - .
  - .
  - Last Day
- Sessions per Day (one, two, etc.)
- Session Start Time(s)
- Session Length

Current Enrollment Size

Status (on schedule, postponed, cancelled, etc.)

Table 3. SMART Student Data Records

Name

Organization Code

Physical Location Code

Offering Identification Code

Job Category (Management, Administrative, Scientist/Engineer, Computer Specialist)

Completion Code (attended, did not attend)

PRESS KEY "Z" AFTER COMPLETING EACH LINE

ENTER REQUEST: Create Course

COURSE NAME: Introduction to mini-computers

COURSE CODE: min-1

SPONSOR CODE: midsd

.
.
.

SESSIONS/DAY: 2

START TIMES: 9 am, 1 pm

LENGTH: 3 hrs, 4 hrs

CLASS SIZE: ∅

STATUS: Scheduled

PRESS KEY "A" TO MODIFY INPUT

PRESS KEY "B" TO STORE INPUT

Figure 7. FORMAT FOR COURSE CREATION

If at the time of course creation the user does not have complete information available, he may leave the space blank and proceed to the next line; remaining data can be entered at a later time.

When the user indicates that the information is to be stored, the system will do so, and automatically set up an attendee file to receive names and other information about registrants in the course.

A potentially useful feature which could be designed into the system is an automatic check at the time of course creation on whether a course has already been set up for the subject of interest. Such a routine would, at the time the course name and code are entered, search the files and, if the same code is found, return a message:

```
COURSE CODE "MINI", NAME "MINICOMPUTERS" CREATED 7/6/76
STATUS IS:  ON SCHEDULE
PRESS KEY "X" FOR DESCRIPTION.
```

The user would be able to view a full set of descriptive data on the previously entered course and decide on the basis of relevance, scheduling, cost, current enrollment, etc., whether it is necessary to proceed with the development of his own course of instruction or send his people the other course. In the latter case, the user would cancel the "creation" of his course.

Similar automatic system checks could be made on requested facilities; for example when the user has entered scheduling and site data, the system would search the files for earlier requests and, in the event of a conflict, return a message such as the following:

SITE "XYZ" RESERVED ON DATES REQUESTED BY:
C.L. JONES, TRAINING COORDINATOR
NATIONAL COMPUTER CENTER, TRIANGLE PARK
PHONE: 123-4567

The user may then either change the date of his course offering or locate another training site. The value of such a system feature is its ability to detect and communicate planning problems before a great deal of time and resource is expended.

Student Registration

Once the course is created and the necessary course and offering data entered into the system, the training officer may then use the system to record student enrollments as they are received. Figure 8 presents a sample format for this function. When the user completes the required entries for a student, the system sets up a record for him and enters the information provided as well as a blank field for the completion code; the latter element is to be provided at the end of the course when the instructor files an after-course report with the training officer. At the time the student is registered, the system will update the enrollment field in the course description record. Protection against over-enrollment will be provided by means of a message generated whenever the current enrollment size equals the maximum class size, e.g.:

ENTER REQUEST: register student
COURSE CODE: min-1
ENROLLMENT FOR COURSE CODE MIN-1 IS FULL

A number of automatic system checks in support of training management and coordination are possible. Suppose for example that midway during the enrollment period it is determined that the course schedule must be

changed. When the user makes the changes in the course description data, the system will automatically generate the following message:

8 STUDENTS REGISTERED PRIOR TO PRESENT DATE:
PRESS KEY "Z" FOR NAMES, ADDRESSES AND PHONE NOS.

The user is then in a position to notify attendees readily and with a minimum of effort required to locate them. Additional warnings could be generated whenever the system determines that changes in course and/or offering characteristics conflict with other commitments of time and resources.

PRESS KEY "Z" AFTER COMPLETING EACH LINE

ENTER REQUEST: register student

COURSE CODE: min-1

CURRENT ENROLLMENT IS 10; REMAINING OPENINGS IS 5.

ENTER STUDENT NAME: Smith, Arthur

SS NUMBER: 216-42-3015

ORGANIZATION CODE: abc

LOCATION CODE: xyz

TRAINING PLAN: no

PRESS KEY "A" TO MODIFY INPUT

PRESS KEY "B" TO STORE INPUT

Figure 8. FORMAT FOR STUDENT REGISTRATION